San Bernardino County Essential Facilities Risk Assessment (SBEFRA)

First Community Executive Committee (CEC) Meeting

February 19, 2008

FEMA MAP IX-Mainland MMI ABS Consulting

Introductions

- Community Executive Committee
- FEMA Region IX
- Project Team
- Guests

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Meeting Agenda

- Welcome and Introductions
- Project Overview & the Role of the CEC
- Technical Discussion - HAZUS
- Earthquake Hazards
- Flood Hazards
- Community Participation
- Next Steps
- Open Discussion

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Emergency Management Philosophy

- Today's challenges in emergency management require pro-active planning, risk assessment and information sharing.
- We need to leverage innovative technologies and public-private partnerships to better address disaster planning and management.
- The first step is to assess vulnerabilities and the population at risk before we can mitigate and manage the risk.
- Government (Federal, State & Local) and Community participation is essential.

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Project Goal

- San Bernardino County is one of several communities to be selected for this comprehensive multi-hazard HAZUS-Map Mod Risk Assessment.
- The DFIRM update provides us with an excellent opportunity to demonstrate the synergies between FEMA's Map Modernization (Map Mod) Project and FEMA's HAZUS® natural hazard loss estimation software, with products useful to emergency preparedness and hazard mitigation planning.

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Hazard Mitigation Plans

- Importance of having a Hazard Mitigation Plan
  - Disaster Relief Funding
  - Mitigation Funding
- 5 year update
- Status of communities in San Bernardino County
  - 58 organizations in San Bernardino Co. with Hazard Mitigation Plans
  - FEMA Approved Plans in 2005
    - For 21 Cities, plus the County
    - For 37 Special Districts

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Funding Impacted by the HMP

Individual Assistance

After a disaster, Federal funds are provided to qualified individuals to facilitate recovery. Assistance comes in the form of low interest loans*, housing assistance, cash grants etc. → Not impacted by plan

Public Assistance

Categories A & B: Emergency measures and debris removal → Not impacted by plan

Categories C-G: Reconstruction of public facilities and infrastructure to current codes and standards. → An approved State or Tribal plan is required in order to receive funding.

Mitigation

Hazard Mitigation Grant Program (HMGP): A portion of the total disaster grants (disaster operations cost less administrative costs) may be awarded by FEMA to the impacted State to implement long-term hazard mitigation measures after a major disaster declaration.

Pre-Disaster Mitigation Program (PDM-C): An annual competitive grant not tied to a disaster.

→ An approved State or Tribal and Local, Multi-jurisdictional or Local Tribal plan is required in order to receive funding for projects. Funding support for planning remains available only at the local level.

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Grant Program using HAZUS Results

- **HAZARD MITIGATION GRANT PROGRAM (HMGP)**
  - Hazard Mitigation Grant Program (HMGP) funds are available following a Presidential disaster declaration
  - all funds must be used to reduce or eliminate losses from future disasters
    - Elevating flood-prone homes or businesses
    - Implementing minor flood control projects to protect critical facilities
    - Federal law requires States and communities to have FEMA-approved mitigation plans in place prior to receipt of HMGP project funds
- **FLOOD MITIGATION ASSISTANCE PROGRAM (FMA)**
  - Planning grants are used to assess flood risks and develop Flood Mitigation Plans to reduce the risks
  - Project grants
  - Project grants are available to NFIP-participating communities that have a Flood Mitigation Plan in place
- **PRE-DISASTER MITIGATION PROGRAM (PDM)** - hazard mitigation planning and implementation of mitigation projects prior to a disaster even
  - Protective measures for utilities and storm water management
  - Relocation of public or private structures

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Project Overview

- Effort to be guided by a Community Executive Committee led by San Bernardino County
- Essential Facilities Data Collection and HAZUS Incorporation
- Incorporation of County Assessor's data, if available.
- Earthquake Hazard Scenario Selection (2) and Risk Assessment
- Incorporation of DFIRM data into HAZUS
- Flood Risk Assessment (Two 100 yr events, w/ & w/out levees & one 500 yr event)
- Risk Assessment Report
- One year schedule

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Project Phases

- 4 Phases:
  - 1 – Initial Coordination, Establishment of Community Exec. Committee, Identify points of contact
  - 2 - Data Collection & Review (*CEC meeting upon completion)
  - 3 - HAZUS Analyses - EQ & Flood (*CEC meeting upon completion)
  - 4 - Risk Assessment Report (*Community Roll-Out upon completion)

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Vision for the Executive Committee

- San Bernardino County to coordinate the CEC and invite representatives to participate
- We hope it will establish representation from local communities and agencies to work with FEMA for enhancement of the County's capabilities for natural hazard risk assessment.
- Other county HAZUS projects have CECs with representatives from Cities & the County, in the areas of Emergency Management, Fire, Police, Schools, Hospitals/EMS, Indian Reservations, and Congressional Representatives.
- The working group will meet 3 times over the next year to guide development, ensure usability of products, and result in the best possible risk information for San Bernardino County.

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SBEFRA CEC Members (Invited)

- City of Colton
- County Administrative Office/EMS
- County Administrative Office
- County Assessor's Office
- County Board of Supervisors
- County Fire Department
- County Fire Department, Office of Emergency Services (Denise Benson, CEC Chair)
- County Information Services Department
- County Land Use Services Department
- County Land Use Services Department/B&S
- County Public Health Department
- County Public Works Department
- County Sheriff's Department
- County Special Districts
- ESRI
- School Districts
- State OES
- Tribes (San Manuel Band of Mission Indians)
- Hospital Assoc. of So. Cal.
- SCAG

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What Value Are the Results?

- Risk Assessment results feed directly into Hazard Mitigation Planning
- Establishes a Community Executive Committee knowledgeable about the process, results, and future directions.
- Centralized GIS Data to be shared with community partners:
  - Essential Facilities
  - Enhanced Regional Building Inventory, if developed
  - Risk Assessment Report for Flood and Earthquake DFIRM data layers

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Technical Discussion: Introduction to HAZUS

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Overview of HAZUS (Hazards US) Software

- Standardized, nationally applicable earthquake, flood and wind loss estimation methodologies.
- Developed by FEMA, under a cooperative agreement with NIBS (see http://nibs.org/hazusweb/ and http://www.fema.gov/plan/prevent/hazus/).
- Uses PC-based Geographic Information System (GIS) software, ArcGIS (Requires installation of ArcGIS 9.2, ArcGIS 9.2 Service Pack 2, and Spatial Analyst for flood modeling)
- HAZUS is distributed to users free of charge
- HAZUS-MH MR-3 was released in September, 2007

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What does HAZUS do?

- Estimates physical damage to:
  - Buildings and their contents
  - Essential facilities (including hospitals, schools, etc.)
  - Transportation lifelines (e.g., Bridges)
  - Utility lifelines (e.g., electric power, water systems)
- Assesses how populations might be affected
  - Shelter needs
  - Casualties (Earthquake only)
  - Power and water outage (Earthquake only)

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How does HAZUS estimate losses?

- Predicts damage and estimates dollar losses for:
  - Buildings
  - Lifelines
  - Regional economy
- Answers 'what if' questions
  - Building code modifications
  - Levee or flow regulation structure
  - And much more…

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HAZUS' Benefits

- HAZUS-MH allows user to:
  - **IDENTIFY** vulnerable areas that may require planning considerations
  - **ASSESS** level of readiness and preparedness to deal with a disaster before disaster occurs
  - **ESTIMATE** potential losses from specific hazard events (before or after a disaster hits)
  - **DECIDE** on how to allocate resources for most effective and efficient response and recovery
  - **PRIORITIZE** mitigation measures that need to be implemented to reduce future losses (what if)

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HAZUS-MH Loss Estimation Methodology

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HAZUS-MH Outputs

	Earthquake Ground Shaking Ground Failure	Flood Frequency Depth Discharge Velocity	Hurricane Wind Pressure | Missile | Rain
Direct Damage			
General Building Stock	✓	✓	✓
Essential Facilities	✓	✓	✓
High Potential Loss Facilities	✓		✓
Transportation Systems	✓	✓	
Utility Systems	✓	✓	
Induced Damage			
Fire Following	✓		
Hazardous Materials Release	✓		✓
Debris Generation	✓	✓	✓
Direct Losses			
Cost of Repair	✓	✓	✓
Income Loss	✓	✓	✓
Crop Damage		✓	
Casualties	✓	Generic Output	
Shelter Needs	✓	✓	✓
Indirect Losses			
Supply Shortages	✓	✓	
Sales Decline	✓	✓	
Opportunity Costs	✓	✓	
Economic Loss	✓	✓	

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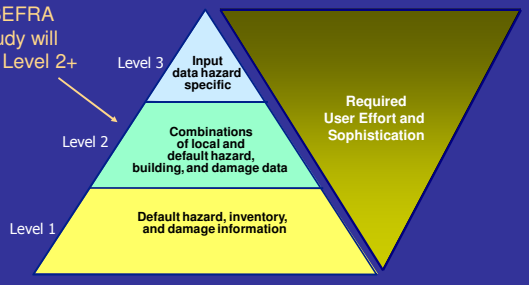
Levels of Analysis

SBEFRA Study will be Level 2+



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HAZUS-MH Default Inventory Data

Default inventory data includes:

- "General building stock" - proxy representation of all buildings in the U.S.
- Essential facilities* – fire stations, police stations, EOCs, hospitals, and schools ← PROJECT PRIMARY FOCUS
- Transportation lifelines* – highway, railway, etc.
- Utility Lifelines* – water, power, gas, etc.
- Demographics
- Economic values

* In some cases, default data may be limited or unavailable

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Inventory Data

- Essential Facilities inventory data is stored two ways:
  - Data common to all hazards
    - Address
    - Geographic Location
    - Contact Info, etc.
  - Hazard-specific data
    - EQ – model building type, quality, design level, site-specific EQ hazard data
    - Flood – Pre-FIRM/Post-FIRM, foundation type, first floor elevation, flood protection

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Risk Assessment Results

- San Bernardino County Impact Estimates:
  - Economic losses, Building damage
  - Population Impacts (casualties – EQ only, shelter needs – EQ & flood)
- Essential facilities Damage:
  - Damage Assessment
  - Facility Functionality

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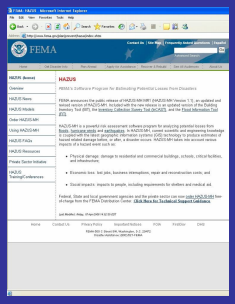
- HAZUS-MH Overview
- Resources
- Conference Information
- FAQs



http:// www.fema.gov/plan/prevent/hazus/index.shtm

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Earthquake Hazards

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EARTHQUAKE LOSS ESTIMATION USING HAZUS

(Courtesy S. McAfee, CA OES)

Epicenter Location and Magnitude

GIS Based Attenuation Model

Soil Maps

Ground Shaking Maps

Building Inventory Maps

Demographic Maps

Model

Model

Direct and Indirect Losses

Casualties/ Shelter Needs Estimation

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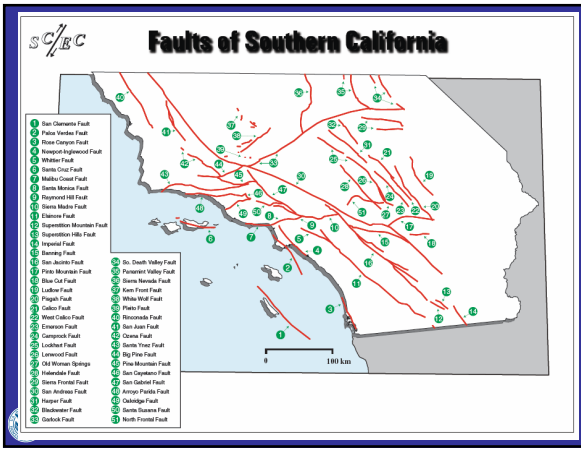
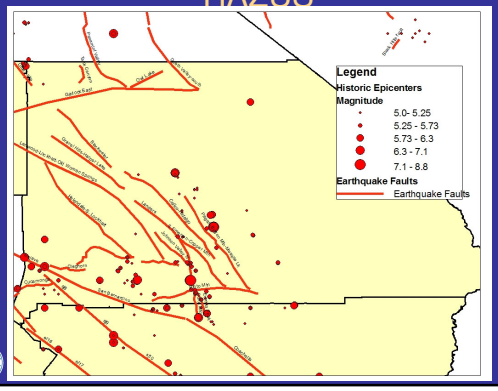
Faults of Southern California



San Bernardino County Faults in HAZUS



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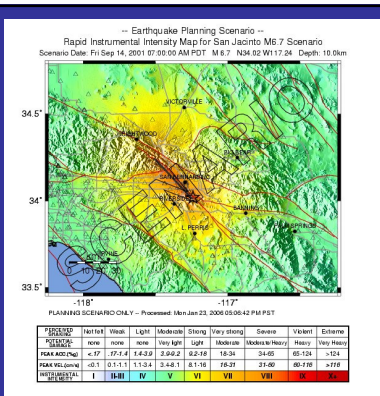
GROUND SHAKING MAPS & DATA

ShakeMaps available for So. Cal. From the USGS –

SCENARIO EARTHQUAKES



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http://www.cisn.org/shakemap/sc/shake/

Shaking & Potential Damage

Intensity	Acceleration (%g)	Perceived Shaking	Potential Damage
I	< 0.2	Not Felt	None
II-III	0.2 - 1.5	Weak	None
IV	1.5 - 4	Light	None
V	4 - 9	Moderate	Very Light
VI	9 - 18	Strong	Light
VII	18 - 34	Very Strong	Moderate
VIII	34 - 65	Severe	Mod. to Heavy
IX	65 - 124	Violent	Heavy
X+	> 124	Extreme	Very Heavy

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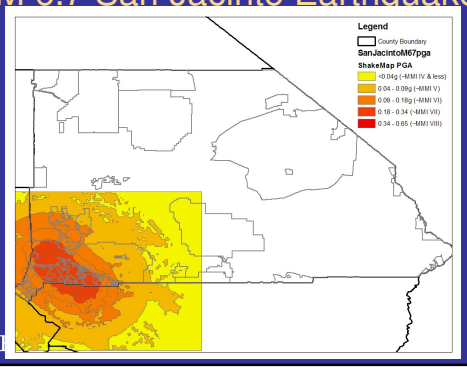
Adapted from http://pasadena.wr.usgs.gov/shake/pubs/shake/shake.html

Scenario ShakeMap for a M 6.7 San Jacinto Earthquake



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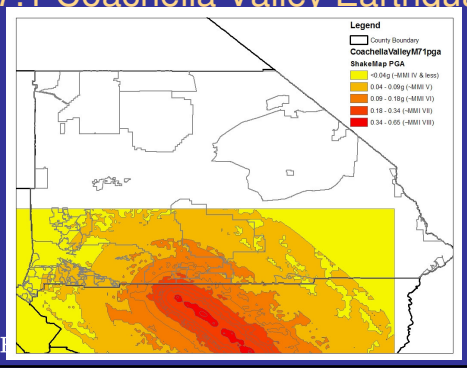
Scenario ShakeMap for a M 7.1 Coachella Valley Earthquake



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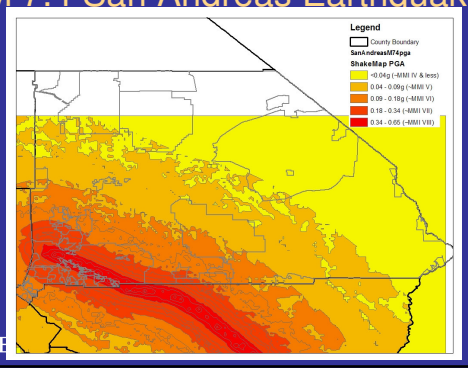
Scenario ShakeMap for a M 7.4 San Andreas Earthquake



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Flood Hazards

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Digital FIRM

Base Map +

Flood Data

=

Digital FIRM

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Flood Hazard Data

- DFIRM effective 08/28/2008
- 26 streams with levee systems in the county that are in the process of accreditation. Some of these are:
  - Santa Ana River
  - Mojave River
  - Mill Creek
  - Lytle Creek
  - Etiwanda and San Sevaine Channel
  - East Twin Creek
  - Cucamonga Creek
  - City Creek
  - Twenty-nine Palms Creek
  - Cajon Wash
  - Cable Creek Channel

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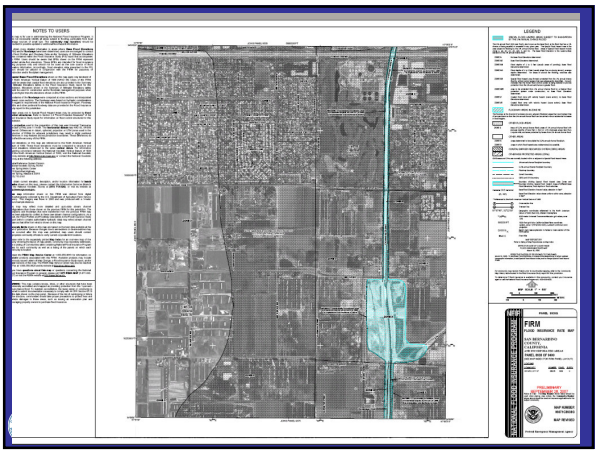
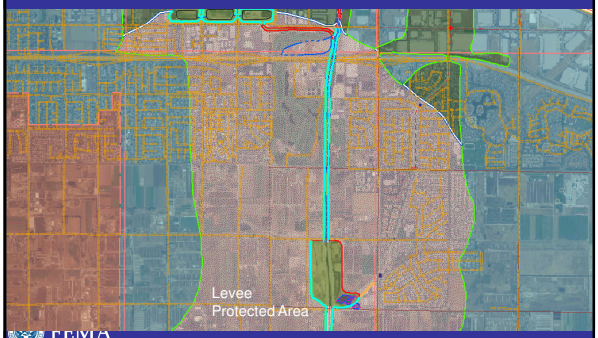


Part of the levee system for Cucamonga Creek



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Data Collection Process

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Basic Data Collection Process

- Centralized GIS databases exist within the County and from other sources. These databases will serve as starting points for enhanced HAZUS database development.
- All available data will be assembled, reformatted, and distributed back to individual communities by the County. The communities will be asked to provide crucial missing facility data.

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Required Facility Data

- Facility Name
- Address
- Geographic Location
- Contact Phone Number
- # Fire-fighting Apparatus* (for fire stations only)
- Building area (square footage)
- Year built
- Number of stories
- Structure Type/Construction materials
- Replacement cost
- Back-up power
- Foundation Type
- First floor height
- Flood protection

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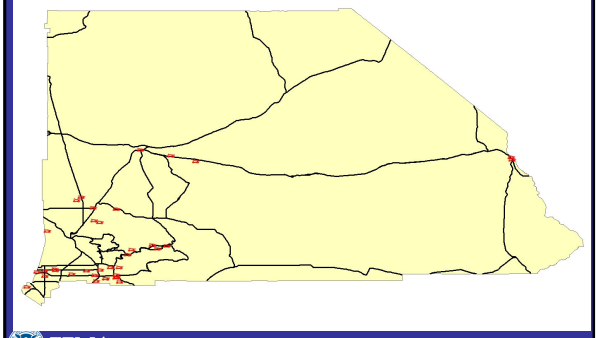
HAZUS Default data for Fire Facilities (37)



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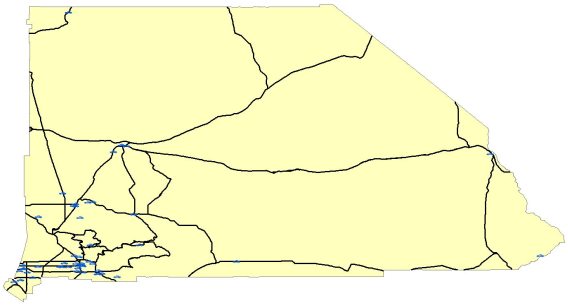
HAZUS Default Data for Police Fac. (57)



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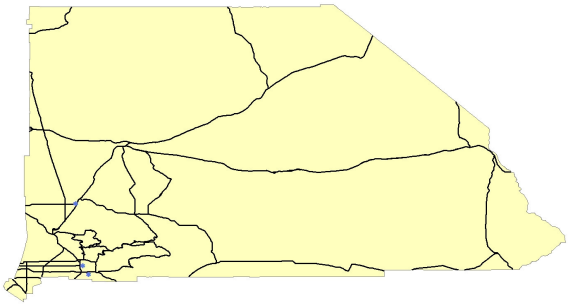
HAZUS Default Data for EOCs (4)



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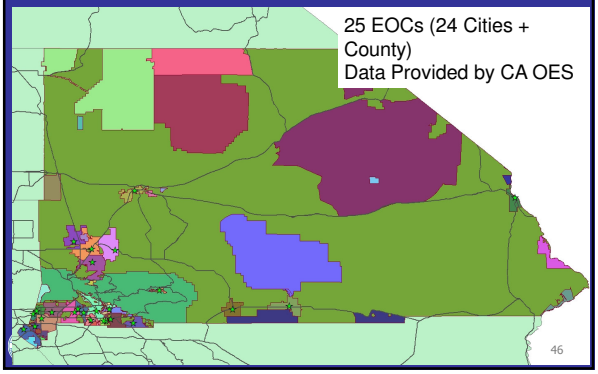
Improved GIS Data for EOC's



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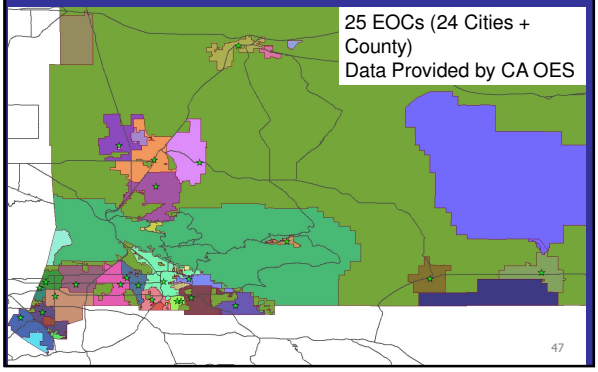
Improved GIS Data for EOC's



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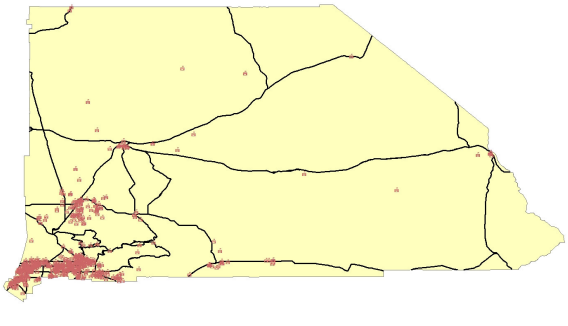
HAZUS Default data for Schools (603)



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School Data Collection

- For Orange County pilot study, sample detailed insurance appraisal data rec'd from one school district (~10% of school buildings/enrollment in OC).
- Report included a significant amount of data needed for HAZUS, including:
  - Location - # Stories - Year Built
  - Building Value - Area/SQFT - Kitchens
  - Construction/Structural Info

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Detailed Sample Data Compared to HAZUS Default

	School Data	HAZUS Default
# School Sites	57	50
# Buildings	1109	Individual building data not included (*Each school campus treated as a single "building"*)
Building Area (sq ft)	4.45 Million	No Data
Building Value	$626.9 Million	$29.5 Million
Contents Value	$83.6 Million	Not included
Enrollment	57,346 (OCDE)	57,994
Year Built	1932 – 2006 Median = 1991	No Data
# Portable Buildings	706 (64%) Typ. 960 SF, $72,000 bldg	No Data

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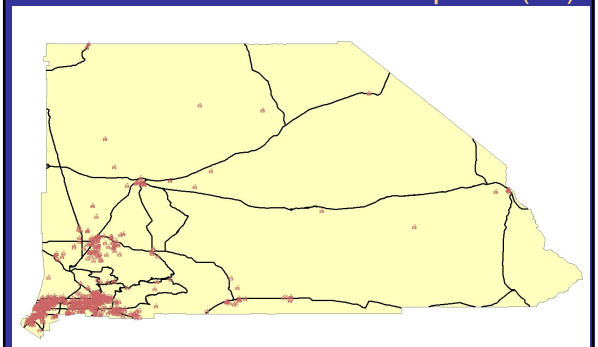
Insurance provider (ASCIP) has since provided data for all OC districts – 5412 buildings in 15 districts, 24 MSF, $3.5B bldg value

San Bernardino Co. School Districts

Property Insurance Provider	School Districts	Data collection status
Alliance of Schools for Cooperative Insurance Programs (ASCIP)	Chaffey, Colton, Upland (3)	Data provided by ASCIP
Southern California Schools Risk Management Joint Powers Authority (SCSRM JPA)	Adelanto, Alta Loma, Apple Valley, Baker Valley, Barstow, Bear Valley, Central, Chino Valley Cucamonga, Etiwanda, Helendale, Hesperia, Lucerne Valley, Morongo, Mountain View, Mt. Baldy, Needles, Ontario-Montclair, Oro Grande, Rim of the World, San Bernardino City, San Bernardino Co. Office of Educ., Silver Valley, Snowline, Victor, Yucaipa-Calimesa (26)	Need contact at SCSRM JPA
Other	Fontana, Redlands, Rialto, Trona, Victor Valley (5)	?

HAZUS Default data for Hospitals (24)



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Hospital Data

Hospital Site Data	Hospital Building Data
Hospital Name	Building Name
OSHPD Facility number	SPC rating as reported to/by OSHPD
Street Address	Year Built
Number of Buildings	Number of Stories
Number of licensed (acute care) beds	Structural System/Construction Type
	Building Area (square footage)
	Replacement cost
	Back-up Power
	Foundation Type
	First Floor Elevation
	Flood protection

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Next Steps

- All Coordination through San Bernardino County
- Project Team will assemble available data; County will transmit to communities for review and addition of facility construction data
- Project Team will work with County to acquire Assessor's data
- Project Team will work with County to identify contact within School Districts/Insurance provider
- Next CEC meeting at the end of data collection process – will select earthquake scenarios.

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Questions & Discussion

- FEMA is excited to work with San Bernardino County on this important project, to blaze a new trail in emergency preparedness and risk assessment!
- This project has unlimited potential for future applications…this project is for you…
- Questions?

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Contact Information

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See: www.sbcfire.org/oes/index.asp for project documents, etc.

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